

**REMARKS/ARGUMENTS**

This Amendment is responsive to the Office Action of the Examiner mailed March 27, 2003.

**Claim Objections 35 USC 112, second paragraph**

Claim 6 is rejected under 35 U.S.C.112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the claim was dependent upon itself. That dependency has now been changed to claim 5.

Claims 2-8 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1-6 of U.S. Patent No. 6,101,199. Although the conflicting claims are not identical, they are not patentably distinct from each other. Applicant submits herewith a Terminal Disclaimer to obviate that rejection.

**Claim Rejections - 35 USC 102**

Claim 1 is rejected under 35 U.S.C 102(e) as being anticipated by Po (US 6,516,124). The rejection states that Po discloses an optical fiber having a core 200 doped with an active species, an inner cladding 210 surrounding the core, an outer cladding 220 surrounding the inner cladding, where the cross sectional shape of the inner cladding 210 is an asymmetric and symmetry broken polygon. It is stated that least one boundary 211 of the boundaries forming the cross section of the inner cladding is an arc (see Fig 3). While the figure shows the cross sectional shape to be symmetrical, Po states that additional shapes for the inner cladding may be used, thus making the cross section asymmetrical (col. 4 line 4-23).

Claim 2, 4, and 7 are rejected under 35 U.S.C 102(b) as being anticipated by Muendel (US 5,533,163). Regarding claim 2, the rejection states that Muendel discloses an article for gain application including a laser diode array, a double cladding fiber laser with the

core doped with an active species, said fiber including an inner cladding, outer cladding, and inherently an aperture for allowing light to enter. The rejection points out that there is a coupling optical system disposed between the laser diode array and the fiber to focus the beam from the array to the fiber. The cross sectional shape of the inner cladding is said to be an asymmetric symmetry broken polygon.

Regarding claim 4, the symmetry broken cladding may be rectangular. Regarding claim 7, Muendel discloses that the optical system may be an optical fiber laser.

The applicants respectfully request the Examiner to reconsider the rejections.

Po does not teach asymmetric cladding shapes. The problem solved in present invention is an unrecognized problem in the prior art. Local modes are problems in all the cross sectional shapes disclosed by Po because of the symmetric shapes. The present application teaches that by using asymmetric and symmetry-broken polygon to minimize or eliminate local modes are unexpected and unrecognized.

In the invention disclosed by Muendel, the need of asymmetric and symmetry-broken cross sectional shape of inner cladding is unrecognized and undesired. The disclosure states that "Each polygon shape has the properties that (i) if a number of identical polygons were used to cover a planar region by tiling, all of the polygons would fit into the tiling arrangement with no spaces present between adjacent polygons and (ii) all the polygons would be mirror images of one another about any common side. Among the several cladding cross-sectional shapes disclosed are convex polygons of three, four, and six sides." (Col 2 line 60-68)

Muendel further elaborates the polygon properties with two criteria as the following " .... The first criterion for the preferred polygon shape is derived from a requirement that a planar array formed by repeated mirror reflections of the cross-sectional shape completely fills the plane.....A second corollary is that each vertex angle must be an integral divisor of 360.degree.....The second criterion arises from a further inspection of the common points where three or more vertices are found. The polygons surrounding a common point can be viewed as

having been generated by a series of multiple reflections beginning with an initial polygon and using the common point as a center of rotation for the series of reflections.....” (Col 12 line 45-Col 13 line 57)

These requirements disclosed by Muendel serve the purpose of forming “essentially uniform radiation field in which the various radiation modes comprising the pump energy are isotropically distributed” (Col 2 line 58-60). The requirement that “all of the polygons would fit into the tiling arrangement with no spaces present between adjacent polygons” excludes the use of asymmetric and symmetry-broken cross sectional shapes of inner cladding.

Contrary to Po or Muendel, the cross sectional shape disclosed in the current invention has an asymmetric and symmetry-broken polygon shapes ensuring the minimization and elimination of local modes, and thus the discovery disclosed in the present application solves an unrecognized problem and is unexpected.

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Applicant respectfully requests that the rejection be with drawn.

#### **Claim Rejections - 35 USC 103**

35 U.S.C. 103(a) is quoted as the basis for all obviousness rejections set forth in the Office Action. Claim 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muendel in view of Tankala et al. (US 6,477, 307).

Neither Muendel (as described in the last section), nor Tankala recognize the importance of asymmetric and symmetry-broken cross sectional shapes for inner cladding. No asymmetric and symmetry-broken cross sectional shape is ever described. The discovery by the applicants was made during intensive research. Obviousness should not apply.

Applicant respectfully requests that the rejection be with drawn.

**Additional References Made of Record**

Lissotschenko et al. US Patent 6,421,178, Armitage et al. US Patent 5,500,764, and Endriz et al. 5,657,153 have been cited in a requested Re-examination proceeding against applicants' Wang et al. United States Patent 6,462,883, this proceeding being lodged by a competitor of Applicants' assignee. Out of an abundance of caution, applicant makes these patents of record in this prosecution.

Wang et al. Patent 6,462,883 (the patent on which re-examination has been requested), deals with the technology of how to put a laser beam into a fiber, no matter what the fiber is. ~~It does not address the mode problem here considered.~~

Regarding the three references, Patent 5,500,764 relates to an optical waveguide amplifier. The patent does not teach anything about the cross sectional shapes of fiber. This reference is even irrelevant to Patent 6,462,883.

Patent 5,657,153 again relates to the construction of an amplifier. Again, it does not teach how to eliminate local modes from a fiber, and it does not teach anything new about cross sectional shapes of inner cladding of a fiber.

Patent 6,421,178 deals with the technique of beam shaping, that is relevant to Patent 6,462,883. This patent is irrelevant to the current application because it is unrelated to the cross sectional shape of a fiber and does not even relates to double cladding as required herein.

**CONCLUSION**

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

Appl. No. 09/824,188  
Amdt. dated June 18, 2003  
Reply to Office Action of March 27, 2003

PATENT

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,

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